

PROCEEDINGS
OF THE
BIOLOGICAL SOCIETY OF WASHINGTON

NEW RECORDS AND DESCRIPTIONS OF
CALIFORNIAN DIPLOPODA

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I am indebted to Mr. Joe E. Gorman for most of the millipeds reported on in this paper. With but two exceptions, which are indicated, they were among the invertebrate associates that he collected during his study of the ecology of the salamander genus *Hydromantes*. Most are from the Sierra Nevada Mountains of California. Holotypes will be deposited in the permanent collection of the American Museum of Natural History. The remaining specimens are in the collection of the author.

Superorder Colobognatha
Order Polyzoniida
Family Polyzoniidae

Bdellozonium sequoium Chamberlin

Bdellozonium sequoium Chamberlin, 1941, Bull. Univ. Utah, biol. ser., vol. 6, no. 3, p. 5 (female, Hammond, Tulare Co., Calif.).

Records: *Mariposa Co.*: Yosemite National Park, Vernal Falls, May 30, 1953, one female, 48 segments. Hidden Meadow, April 17, 1954, several specimens, the largest a male of 52 segments, width 3.3 mm.

Order Platydesmida
Family Andrognathidae

Brachycybe producta Loomis

Brachycybe producta Loomis, 1936, Proc. U. S. Natl. Mus., vol. 83, no. 2989, pp. 367-368, fig. 32, h, i (male, ? central mountainous portion of lower California).

Record: *Mariposa Co.*: Yosemite National Park, Vernal Falls, May 30, 1953, one female, 76 segments.

Eucybe clarus Chamberlin

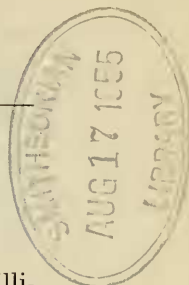
Eucybe clarus Chamberlin, 1941, Bull. Univ. Utah, biol. ser., vol. 6, no. 4, p. 3 (female, Hastings Reservation, Monterey Co., California).

Record: *Tulare Co.*: Silliman Gap Trail, Redwood Canyon, Sequoia National Park, May 16, 1953, fragment of one male.

Superorder Eugnatha
Order Spirobolida
Family Spirobolidae

Californibolus uncigerus (Wood)

Spirobolus uncigerus Wood, 1864, Proc. Acad. Nat. Sci. Philadelphia,



vol. 15, p. 15 (male, California); 1865, Trans. Amer. Philos. Soc., vol. 13, p. 209, fig. 36.

Tylobolus uncigerus, Cook, 1904, Harriman Alaska Exped., vol. 8, no. 1, p. 67.

Californibolus uncigerus, Chamberlin, 1949, Jour. Washington Acad. Sci., vol. 39, no. 5, p. 166.

Records: *Shasta Co.*: Low Pass Creek, April 1, 1953, two males; March 25, 1951, one female, width 8.7 mm., 49 segments. Round Mountain, April 1, 1953, one male, width 7 mm., 52 segments.

The color is variable. Usually the midbelts are bright red-brown, but they may be gray; the hindbelts vary from bright brown to very dark brown. The distribution of prickles on the cephalic surface of the last article of the posterior gonopods is as in *C. rectus* Chamberlin, 1949. Other details of the gonopods correspond to Wood's figure.

Californibolus pontis Chamberlin

Californibolus pontis Chamberlin, 1949, *ibid.*, vol. 39, no. 5, p. 166, figs. 18, 19 (male, Bridgeville, Humboldt Co., California).

Record: *Shasta Co.*: Low Pass Creek, April 14, 1952, one male, width 4.7 mm., 52 segments.

Auxobolus ergus Chamberlin

Auxobolus ergus Chamberlin, 1949, *ibid.*, vol. 39, no. 5, p. 163, figs. 5-7 (male, Tollhouse, Fresno Co., California).

Record: *Mariposa Co.*: Trail between Vernal Falls and Happy Isles, Yosemite National Park, Feb. 27, 1954, one male, width 7 mm., 56 segments.

Several females and larvae collected at Briceburg, Mariposa Co., November 13, 1952, January 3, 1953, and February 26, 1954, have been tentatively assigned to this species.

Order Julida

Family Paraiulidae

Spathiulus elegantulus Causey

Spathiulus elegantulus Causey, 1950, Proc. Ark. Acad. Sci., vol. 3, pp. 47-48, figs. 18-21 (male, Happy Isles, Yosemite National Park, California).

Record: *Mariposa Co.*: Trail between Vernal Falls and Happy Isles, Yosemite National Park, Feb. 27, 1954, one male, 53 segments, 3 legless, light brown.

? *Bollmaniulus*

Records: *Mariposa Co.*: Trail between Vernal Falls and Happy Isles, Yosemite National Park, Feb. 27, 1954, one larva. *Shasta Co.*: Madison Creek, Sept. 2, 1951, one female, width 4.3 mm., several larvae.

Family Paeromopidae

Paeromopus cavicolens Chamberlin

Figure 1

Paeromopus cavicolens Chamberlin, 1953, Proc. Biol. Soc. Washington, vol. 66, pp. 68-69, figs. 3, 4 (male, Windeler Cavern, Tuolumne Co., California).

Records: *Mariposa Co.*: Vernal Falls, Yosemite National Park, May 30, 1953, one female, width 5.8 mm., 71 segments. Breeceburg, Feb. 26, 1954, one female, width 5.8 mm.; several larvae. *Shasta Co.*: Low Pass Creek, Jan. 29, 1953, one female, width 6.4 mm.; March 25, 1952, one female, width 7.4 mm., 72 segments; April 1953, one female, width 7.4 mm., 73 segments. Bass Creek, April 1953, one female, width 7.6 mm., 69 segments.

The details of the anterior gonopods of this species are shown in figure 1. The apex of the posterior gonopods is expanded into a small, thin-walled corolla. In specimens from Shasta County there is an orange band on the metazonites that extends as far ventrad as the pores, but in specimens from Mariposa County the dorsal orange bands are almost or completely replaced by the general body color. No significant differences between the gonopods of the specimens from these two counties were observed.

Atopolus chamberlini (Brölemann)

Figure 2

Paeromopus chamberlini Brölemann, 1922, Ann. Ent. Soc. Amer., vol. 15, no. 4, pp. 289, 298-299, figs. 6-9, 53-57 (male, Mt. Shasta, Siskiyou Co., California).

Atopolus chamberlini, Chamberlin, 1949, Nat. Hist. Misc., no. 52, p. 4.

Records: *Shasta Co.*: Low Pass Creek, Jan. 24, 1953, one male, width 4.7 mm.; one female, width 5 mm. Round Mt., April 1953, several larvae.

Mr. Gorman described this species in his field notes as "brown, with a broad, cream, dorsal, longitudinal band." The female has the band the entire length of the body, but in the male it extends only half the length of the body. The minute details of the gonopods differ a little from Brölemann's figures, possibly because he was more interested in the fundamental relationships of this species than in its specific characters. The right anterior gonopod is shown in figure 2.

Klansolus vicinus (Chamberlin)

Californiulus vicinus Chamberlin, 1943, Bull. Univ. Utah, biol. ser., vol. 8, no. 2, pp. 12-13, figs. 40-42 (male, Dickson Flats, Shasta Co., California).

Klansolus vicinus Chamberlin, 1949, Nat. Hist. Misc., no. 52, p. 5.

Record: *Shasta Co.*: Lassen Volcanic National Park, Summit Lake, June 26, 1951, one male, 73 segments, width 4.4 mm. (L. R. and H. W. Levi).

Klansolus yosemitensis (Chamberlin)

Californiulus yosemitensis Chamberlin, 1941, Bull. Univ. Utah, biol. ser., vol. 6, no. 4, p. 17, pl. 3, figs. 24-26 (male, Aspen Valley, Yosemite National Park, California).

Klansolus yosemitensis Chamberlin, 1949, Nat. Hist. Misc., no. 52, p. 5.

Records: *Mariposa Co.*: Yosemite National Park, Vernal Falls, May 30, 1953, two males, one female; Mariposa Grove, May 14, 1879, one female, 70 segments, 6 mm. (Illinois Natural History Survey). *Tulare Co.*: Sequoia National Park, Redwood Canyon, Silliman Gap Trail, May 16, 1953, one female, 68 segments, width 5 mm.

Order Chordeumida
Family Caseyidae
Caseya sequoia Chamberlin

Caseya sequoia Chamberlin, 1941, Bull. Univ. Utah, biol. ser., vol. 6, no. 5, p. 10, pl. 2, figs. 17-18 (female, Sequoia National Park, Tulare Co., California).

Records: *Mariposa Co.*: Briceburg, February 26, 1954, one female.
Tuolumne Co.: Sonora Pass, November 15, 1952, one immature male.

Family Conotylidae
? *Conotyla*

Record: *Mariposa Co.*: Trail between Vernal Falls and Happy Isles, Yosemite National Park, Feb. 27, 1954, one female, length 11 mm.

Order Polydesmida
Family Xystodesmidae

All of the xystodesmids in this collection have the second article of the legs spined and the first article and the adjacent sternum unspined. The following key is based on somatic characters, mostly generic, of specimens of either sex, and it must be supplemented with figures of the male gonopods:

- 1(2). Anterior margin of collum elevated near each antenna. Keels of second segment extend farther laterad and ventrad than do those of either the collum or the third segment.....*Amplocheir reducta*
- 2(1). Anterior margin of collum not elevated at any point. Keels of second segment not conspicuously wider or lower than those of the collum or of the third segment..... 3
- 3(8). Keels of second, third, and sometimes the fourth, segments directed slightly cephalad; anterior angle of these keels square and often bearing a single small tooth 4
- 4(5). Keels of middle body segments quadrangular.....*Harpaphe pottera*
- 5(4). Keels of middle body segments triangular 6
- 6(7). Anterior margin of collum forms an uninterrupted convex curve*Hybaphe tersa*
- 7(6). Anterior margin of collum convexly curved, but interrupted near each antenna by a very shallow depression.....?*Paimokia*
- 8(3). Keels of second, third, and fourth segments directed laterad; anterior angles of these keels rounded, never bearing an obscure tooth 9
- 9(10). Metazonites of last few segments with several irregular rows of tubercles*Xystocheir cooki*
- 10(9). Metazonites of last few segments with faint traces of a single row of tubercles on the margin.....*Delocheir conservata*

Harpaphe pottera Chamberlin

Harpaphe pottera Chamberlin, 1949, Proc. Biol. Soc. Washington, vol. 63, p. 129, fig. 10 (male, Potter Creek, Mendocino Co., California).

Records: *Shasta Co.*: Brock Mt., April 16, 1952, one male, one female.
Low Pass Creek, March 25, 1951, one female; January 21, 1952, one male.
Madison Creek, September 2, 1951, two males, widths 6.6 and 6 mm.

Hybaphe tersa Cook

Hybaphe tersa Cook, 1904, Harriman Alaska Exped., vol. 8, no. 1, p. 58 (male, Almata, Whitman Co., Washington).

Records: *Shasta Co.*: Low Pass Creek, January 29, 1953, one male, one female; April 1953, one male. Madison Creek, Sept. 2, 1953, two males.

In the only specimens in which the color appears to be fully developed, the metazonites are red-orange and the prozonites are green to brown. The shape of the prefemoral branch of the gonopods is somewhat variable as to width and the apex is either acute or rounded.

Xystocheir cooki, new species

Figure 3

Diagnosis: All four prongs of the male gonopod are attenuated as in *Xystocheir tularca* Chamberlin 1949, but they are relatively wider and shorter than described for that species.

Type locality: Tulare Co., Sequoia National Park, Redwood Canyon, Silliman Gap Trail, May 16, 1953, two males, one female.

Male holotype: Width 5.5 mm. Color faded in preservative. Dorsum shining. Beginning sparsely on the second segment and becoming very numerous proceeding caudad, there are small but well defined tubercles on the metazonites, but not on the keels. On segment 16 there are four or five very indefinite rows, with about 20 in each row, while on segments 18 and 19 they are more numerous, but not contiguous. Keels of segments two through four directed laterad; their anterior angle is rounded and the posterior angle is right to a little obtuse. Beginning with the keels of the fifth segment and increasing toward the hind end of the body, the anterior angle is broadly rounded, the posterior angle is produced a little caudad, and the posterior margin is minutely dentate; the lateral margin is either straight or slightly convex. Keels of segment 19 less than half the length and width of keels of segment 18. Dorsum arched. Pores on margin of keels, opening above, and marked by no conspicuous swelling. Anal tergite narrowly produced, the apex truncate. Coxa of the third legs with a sparsely setose, anteriorly directed, finger-like lobe arising from the medial surface; these lobes are about the same thickness and twice the length of the seminal lobes of the second legs. Last two articles and ventral surface of coxae of all legs densely setose; other surfaces of legs sparsely setose. Second article of all legs behind the gonopods spined, the spines long, sharp, and curved on the posterior legs. Coxae and sternum unspined.

Telopodite of gonopods subparallel, not contiguous, all four prongs attenuated, but only the prong carrying the seminal canal is twisted (fig. 3). Shaft of telopodite thickly setose on the dorsal surface; the end of some of the setae reach as high as the base of the lowest prong.

Female paratype: Width 6 mm., length 31 mm. Dorsum a little higher and keels a little narrower than in the male, but the shape of the keels and the distribution of tubercles are as in the male. Coxa of second legs with a stiff, finger-like, ventrally directed process arising from the medio-distal margin. Second article of legs behind the tenth spined as in the male. Below the spine the legs are glabrous; beyond the spine they are sparsely setose, except the tarsus, which is thickly setose.

It is a pleasure to name this species for the late Dr. O. F. Cook.

? Paimokia

Record: *Mariposa Co.*: Briceburg, 0.6 to 0.7 mile northeast, Nov. 15, 1952, one male of 19 segments.

***Amplocheir reducta*, new species**

Figure 4

Diagnosis: Distinguished from *Amplocheir sequoia* (Chamberlin, 1941) by the proximal joint of the male gonopod, which bears, instead of three slender spines, one blunt setose process and a longer, flattened, acute process.

Type locality: *Mariposa Co.*, Briceburg, 0.6 to 0.7 mile northeast, Nov. 15, 1952, one male; Feb. 26, 1954, one female.

Male holotype: Width 4.2 mm., length about 24 mm. Color faded in preservative. Exoskeleton thin. Dorsum weakly arched, most of the keels horizontal. Beginning sparsely on the third segment and becoming more numerous on the metazonites of the posterior segments, there are low tubercles, each with a punctum on its apex. The tubercles are obsolete and scattered on the anterior half of the body, but on the posterior half they are arranged in three rows; the anterior row is scattered, but the second and third are even and distinct. There are seldom more than 20 tubercles in a row, and they never extend out on the keels. Coxa of third legs with a setose, anteriorly directed process about the length and thickness of the seminal lobe of the second legs. A pair of low mounds on the sternum between the fifth legs. All coxae very setose ventrad; other articles of the legs sparsely setose, except the tarsal, which is thickly setose. Sternum glabrous. Coxae and sternum unspined. Second article of all legs behind the gonopods spined.

Anterior margin of collum elevated noticeably near each antenna. Keels of collum widely rounded, for the family. Keels of segments two through four directed laterad; their anterior angle is rounded and the posterior angle is rounded-obtuse. Keels of second segment extend farther laterad and ventrad than the keels of either the collum or of the third segment, thus resembling the *Strongylosomidae*. On segments five through 15 the keels are acute and slightly hooked; behind 15 the caudal angle becomes increasingly less acute. Cephalic and lateral margins of keels form a wide, even curve; caudal margins very finely granulated. Keels of segment 19 about two-thirds as wide and long as those of segment 18. Anal tergite narrowly produced, the apex truncate; apical half depressed. Pores on margin of keels, opening above in a slight swelling.

Telopodites of gonopods subparallel *in situ*, with the mesial processes of the proximal segment crossing. The telopodite ends in two long, curved, aciculiform processes; the proximal segment bears only one process (fig. 4), thus differing from the genotype, *A. sequoia*, where there are three.

Female topotype: Width 5.4 mm. Color incompletely developed, but there are traces of orange on the lateral margin of the keels and of brown on the metazonites. Collum, keels, tuberculation of metazonites, anal tergite, and spination of legs as described for the male. Coxae of second legs with a stiff, finger-like, ventrally directed process arising from the disto-medial margin.

Delocheir conservata Chamberlin

Delocheir conservata Chamberlin, 1949, Jour. Washington Acad. Sci., vol. 39, no. 3, p. 99, fig. 18 (male, Hastings Reservation, Monterey Co., California).

Record: *Mariposa Co.*: Briceburg, Feb. 24, 1952, one male, width 5.6 mm.

Family *Sigmocheiridae*, new family

The family *Sigmocheiridae* is proposed for the genera *Sigmocheir* Chamberlin, 1951, and *Orophe* Chamberlin, 1951, which formerly were included in the family *Eurydesmidae*. Unexpected and previously unpublished characters in these genera are the rigid fusion of the coxae of the gonopods and the concave anterior margin of the wide collum (fig. 5).

Type genus: *Sigmocheir* Chamberlin, 1951.

The following characters apply to a male of the type genus: exoskeleton smooth and heavy, body moniliform; keels high and wide, most of them horizontal, their corners rounded, produced caudad only on the last two or three segments; middle of metazonites slightly higher than keels; apex of anal tergite narrow, conical; pore formula 5, 7, 9, 10, 12, 13, 15-19; pores open laterad from a longitudinal welt; margins of anal valves compressed, elevated; anal sternum triangular; legs without any special enlargements or spines; legs and antennae relatively longer than in the *Xystodesmidae*; sterna of last four or five diplosomites with a small spine adjacent to each coxa; gonopodal opening transversely oval. Coxae of gonopods rigidly fused along a short medial suture; coxae also connected by a thick, transverse muscle dorsal to the suture; coxal horns present on the mesial distal surface of the coxae, just beyond the suture; telopodites simple, directed cephalad, the tibio-tarsal region set off by a suture.

The *Sigmocheiridae* resemble the Mexican and Central American family *Rhachodesmidae*, and if the gonopods did not lack a coxal horn in that family the two groups might be put together. Somatically the *Sigmocheiridae* are very unlike any of the several other families in which the gonopods are coalesced; they undoubtedly represent an independent and rather recent development of that character. The range, Montana and California, overlaps that of the family *Xystodesmidae*, from which they are easily distinguished by the moniliform appearance, the high keels, the absence of spines on the second article of the legs, and the medial fusion of the gonopodal coxae.

Sigmocheir calaveras, Chamberlin

Figure 5

Sigmocheir calaveras Chamberlin, 1951, Nat. Hist. Misc., no. 87, pp. 5-6, figs. 10, 11.

Records: *Calaveras Co.*: Wool Hollow, April 10, 1952, one male, width 7 mm. *Mariposa Co.*: Briceburg, Feb. 24, 1952, one male, width 7.4 mm.; trail between Vernal Falls and Happy Isles, Yosemite National Park, Feb. 27, 1954, one female of 19 segments, width 5.5 mm.

When the color is fully developed the keels are bright yellow, remainder of dorsum except for large, medial, ovoid, yellow areas on the metazonites are yellow; legs lighter yellow.

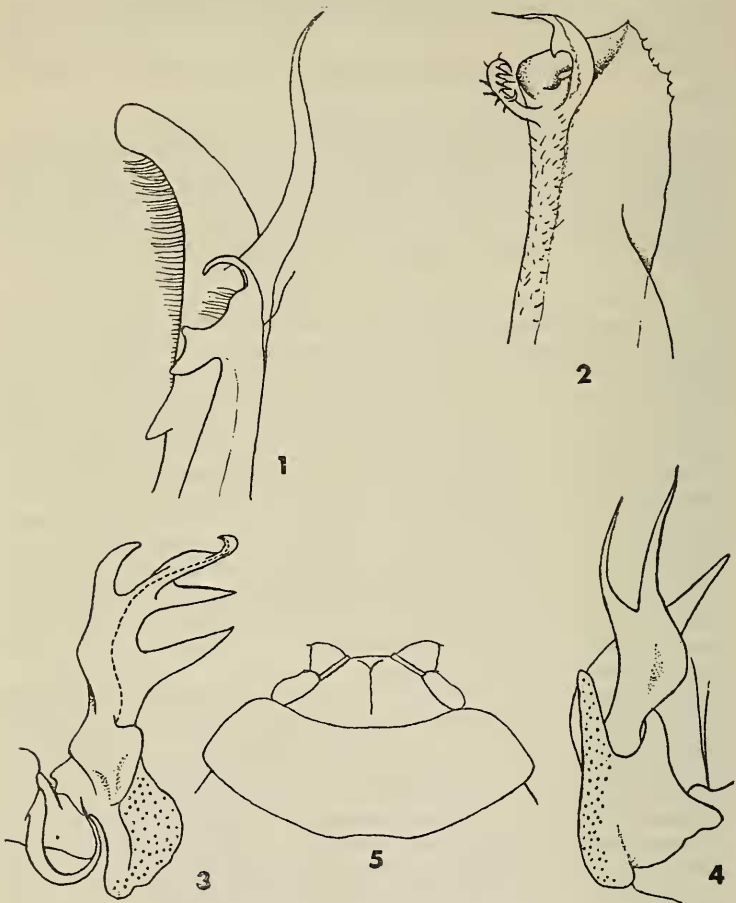


Fig. 1. *Paeromopus cavicolens*. Left anterior gonopod, cephalic surface.

Fig. 2. *Atopoulus chamberlini*. Right posterior gonopod, cephalic surface.

Fig. 3. *Xystocheir cooki*, new species. Left gonopod, subdorsal view, male paratype.

Fig. 4. *Amplocheir reducta*, new species. Left gonopod, subventral view, male holotype.

Fig. 5. *Sigmocheir calaveras*. Head and collum, dorsal surface.